

**BEFORE THE STATE OF NORTH DAKOTA  
PUBLIC SERVICE COMMISSION**

**BADGER WIND, LLC  
BADGER WIND PROJECT – LOGAN AND MCINTOSH COUNTIES  
AMEND – SITING APPLICATION**

**CASE NO. PU-24-087**

**PRE-FILED TESTIMONY OF MARK D. CROWL  
ON BEHALF OF BADGER WIND, LLC**

**June 21, 2024**

1 **I. INTRODUCTION AND QUALIFICATIONS**

2

3 **Q. Please state your name, employer, and business address.**

4 A. My name is Mark D. Crowl. I am employed by Ørsted Onshore North America, LLC  
5 (“Ørsted”). My business address is 401 N. Michigan Avenue, Suite 501, Chicago, IL  
6 60606.

7

8 **Q. What is your position with Ørsted?**

9 A. I am a Director of Development at Ørsted.

10

11 **Q. Briefly describe your work history and education.**

12 A. My career in the energy space began in 2015, and I began working in renewable  
13 development in 2017. My experience includes working with some of the largest and  
14 most successful renewable energy development companies in the United States,  
15 spanning nearly every midwestern state from Texas to North Dakota, ultimately  
16 culminating with my current role at Ørsted.

17

18 Prior to working in energy development, I served in the United States Air National  
19 Guard from 2010-2016. During this time, I also attended the University of Oklahoma,  
20 where I graduated with a degree in Energy Management in 2015. I am currently  
21 pursuing a Master of Energy Business degree from the University of Tulsa. A copy of  
22 my resume is attached as proposed **BW Exhibit 16-A**.

23

24 **Q. What is your role with respect to the Badger Wind Project (“Project”)?**

25 A. As Development Director for the Project, I am responsible for ensuring the Project is  
26 developed so that it adheres with all regulations and industry best practices and is  
27 financeable and economically viable. I oversee a team of project developers that have  
28 contributed to the Project and coordinate with various Ørsted departments and  
29 external parties to keep the Project schedule on track.

30

31 **Q. Who will construct, own, and operate the Project?**

32 A. Badger Wind, LLC will construct, own, and operate the Project.

33

34 **Q. What is the relationship between Badger Wind and Ørsted with respect to the**  
35 **Project?**

36 A. Badger Wind is a wholly owned subsidiary of Ørsted. Ørsted is assisting Badger Wind  
37 with development of the Project.

38

39 **Q. Please describe Ørsted’s experience in the renewable energy industry.**

40 A. Ørsted is an independent renewable energy company based in Boston,  
41 Massachusetts. Ørsted is one of the largest players in North American onshore  
42 renewable energy. Operating assets currently under Ørsted’s ownership represent  
43 3.9 gigawatts (“GW”), and a further 1.5 GW of projects to be owned and operated by  
44 Ørsted are currently under construction. In addition to the portfolio that is currently  
45 under operations and construction, Ørsted’s development pipeline is rapidly  
46 expanding across all North American markets.

47

48 **Q. What proposed hearing exhibits are you sponsoring in your testimony?**

49 A. I am sponsoring the following proposed hearing exhibits:

- 50 • **BW Exhibit 1**: Application for an Amended Certificate of Site Compatibility
- 51 • **BW Exhibit 2**: Summary of Project Adjustments with Project Update Figure
- 52 • **BW Exhibit 3**: Updated Figures 1-13 in support of Badger Wind, LLC’s Application  
53 for an Amended Certificate of Site Compatibility
- 54 • **BW Exhibit 4**: Logan County Wind Energy Facility Siting Permit/Conditional Use  
55 Permit
- 56 • **BW Exhibit 5**: Updated Sound Analysis Report
- 57 • **BW Exhibit 6**: Updated Shadow Flicker Analysis Report
- 58 • **BW Exhibit 7**: Updated Receptor Table
- 59 • **BW Exhibit 9**: Additional Agency Correspondence
- 60 • **BW Exhibit 10**: Summary of Avoidance, Minimization, and Mitigation Measures
- 61 • **BW Exhibit 12**: Updated Sound Analysis Tech Memo (Sound Barriers)

- 62 • **BW Exhibit 15**: Signed Certification Relating to Order Provisions – Wind Energy  
63 Conversion Facility Siting, with accompanying Tree and Shrub Mitigation  
64 Specifications
- 65 • **BW Exhibit 16**: Prefiled Testimony of Mark Crawl
- 66 • **BW Exhibit 16-A**: Crawl Resume

67

68 **Q. What is the purpose of your Direct Testimony?**

69 A. The purpose of my testimony is to provide an overview of the updates to the Project  
70 Area and design, as well as the analysis conducted to ensure compliance with  
71 applicable setback, sound, and shadow flicker requirements.

72

73 **II. UPDATES TO THE PROJECT**

74

75 **Q. Did Badger Wind obtain a Certificate of Site Compatibility (“CSC”) for the**  
76 **Project in 2022?**

77 A. Yes. In February 2022, Badger Wind submitted an Application for a Certificate of Site  
78 Compatibility (“2022 CSC Application”). On November 30, 2022, the North Dakota  
79 Public Service Commission (“PSC”) issued its Findings of Fact, Conclusions of Law  
80 and Order granting Certificate of Site Compatibility No. 64 (“2022 Order and CSC”)  
81 (Case No. PU-22-86) to Badger Wind for the Project.

82

83 **Q. Since the 2022 Order and CSC were issued, has Badger Wind submitted an**  
84 **application for an amendment of the CSC?**

85 A. Yes. On February 23, 2024, Badger Wind submitted its application to amend the CSC  
86 to authorize an updated Project boundary and associated layout modifications.

87

88 **Q. Is proposed BW Exhibit 1 Badger Wind’s Application for an Amended Certificate**  
89 **of Site Compatibility (“Application”) for the Badger Wind Project, which was**  
90 **filed with the PSC on February 23, 2024?**

91 A. Yes.

92

93 **Q. In the Application, what updates were made to the Project from what was**  
 94 **approved by the PSC in 2022?**

- 95 A. The three primary changes to the Project from what the PSC approved in 2022 are:
- 96 • An increase in the size of the Project Area. Badger Wind increased the size of the  
 97 Project Area, which was approximately 31,467 acres (approved by the PSC in  
 98 2022), by adding approximately 3,760 acres of land that were acquired from  
 99 another developer via a lease acquisition. Badger Wind also removed two parcels  
 100 from the 2022 Project Area as a result of consultations with the affected landowner.  
 101 The agreements for those two parcels expired and the parcels were ultimately not  
 102 needed for the updated Project layout.
  - 103 • Use of a different potential turbine model. Badger Wind is now considering a 2.82  
 104 megawatt (“MW”) turbine (rather than a 3.4 MW turbine as was contemplated  
 105 previously).
  - 106 • An increase in the number of turbines. The 2022 Order and CSC approved up to  
 107 79 potential turbine locations. As a result of the additional land added to the Project  
 108 Area and the smaller turbine, Badger Wind is now proposing 102 potential turbine  
 109 locations, of which up to 93 turbines will be constructed.

110  
 111 **Q. Why did Badger Wind make these changes to the Project?**

112 A. As discussed at the June 2022 public hearing, while the 3.4-MW turbine was used for  
 113 analysis purposes in the 2022 CSC Application, Badger Wind was looking into a range  
 114 of potential turbine models, including smaller turbine model(s). In June 2023, Badger  
 115 Wind was finally successful in obtaining leases from a competitor in the area that it  
 116 had been trying to acquire since prior to submitting the 2022 CSC Application. With  
 117 this additional land, Badger Wind was able to consider smaller turbine options that  
 118 make the Project more economically attractive to potential offtakers. Thus, Badger  
 119 Wind redesigned the Project to accommodate the 2.82 MW turbine now under  
 120 consideration for the current Project, which best matches the energy profile at this site  
 121 and allows for more landowner participation in the Project. Badger Wind then  
 122 proceeded to conduct additional surveys and studies for the land added to the Project  
 123 Area in coordination with the appropriate agencies.

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**Q. How has the Project’s nameplate capacity changed?**

A. The Project will have a nameplate capacity of up to 262.26 MW, with up to 250 MW delivered to the grid per the Project’s interconnection agreement. Accordingly, the Project’s nameplate capacity increased nominally from what was approved in 2022, but will deliver the same amount of energy to the grid.

**Q. Explain further how more turbines and a larger Project Area make the Project more marketable when the output to the grid will be essentially the same.**

A. The land added to the Project Area has high output potential. With the additional land, the 2.82 MW turbine now under consideration for the current Project best matches the site’s energy profile, and is also less expensive on a dollar per megawatt basis. By using a smaller turbine and constructing more turbine positions, the Project now has the same output as before, but with a higher net capacity factor, which has better economics. All of this in turn makes the Project more economically attractive to potential offtakers.

**Q. Does the Project continue to meet all the requirements of the 2022 Order and CSC?**

A. Yes.

**Q. Does Figure 3, filed with the Application on February 23, 2024 (proposed BW Exhibit 1), show the changes to the Project Area and layout from the version of the Project approved by the PSC in 2022?**

A. Yes.

150 **III. UPDATES TO THE APPLICATION**

151

152 **Q. Since the Application was filed in February 2024, have there been any additional**  
153 **updates to the Application?**

154 A. Yes. Minor adjustments to the Project Area and layout are described in the Summary  
155 of Project Adjustments and depicted in the Project Update Figure (proposed  
156 **BW Exhibit 2**) and updated Application Figures 1-13 (proposed **BW Exhibit 3**), which  
157 were filed on May 14, 2024.

158

159 **Q. Please describe the updates to the Project Area reflected in Badger Wind's**  
160 **May 14, 2024 filing.**

161 A. As described in the Summary of Project Adjustments (proposed **BW Exhibit 2**), while  
162 conducting a parcel-by-parcel check of the Project's internal GIS lease data, Badger  
163 Wind identified adjustments needed to the Project Area:

164 • Two parcels (shown on proposed **BW Exhibit 2** as Parcels 1b and 1c) were  
165 originally under lease for the Project as part of a larger parcel. After the larger  
166 parcel was leased, Parcels 1b and 1c were sold to a different landowner (leaving  
167 Parcel 1a). The lease covering these parcels had an internal expiration date of  
168 December 31, 2022. While Badger Wind was able to get a lease extension  
169 amendment with the owner of Parcel 1a, Badger Wind was unable to obtain a lease  
170 extension amendment with the owner of Parcels 1b and 1c. The internal GIS lease  
171 data was updated to reflect the correct status, the parcels were excluded from the  
172 Project Area, the residence located on Parcel 1b was changed to nonparticipating,  
173 and collection lines were rerouted to avoid these parcels.

174 • The lease for one parcel (shown on proposed **BW Exhibit 2** as Parcel 2) was  
175 acquired as part of the lease acquisition discussed earlier in my testimony. At the  
176 time of Application filing, Badger Wind was pursuing a new lease with the  
177 landowners, but the landowners have since indicated they do not want to  
178 participate in the Project. As a result, the parcel was changed to nonparticipating  
179 and removed from the Project Area. All proposed facilities have also been

180 removed from this parcel, and adjustments to turbine locations on the neighboring  
181 property have been made to ensure compliance with setback requirements.

- 182 • The lease for one parcel (shown on proposed **BW Exhibit 2** as Parcel 3) had an  
183 internal expiration date of December 31, 2022, and Badger Wind was unable to  
184 obtain a lease extension amendment with the landowner. No facilities were  
185 proposed on this parcel, the GIS lease data was updated accordingly, and the  
186 parcel was removed from the Project Area.

187  
188 Additionally, while conducting the parcel-by-parcel check of the Project’s internal GIS  
189 lease data, Badger Wind noted that three small parcels (shown on proposed  
190 **BW Exhibit 2** as Parcels 4, 5, and 6) were correctly identified and treated as  
191 nonparticipating in the internal GIS lease data (including for all setback purposes), but  
192 did not have the Project Area border around them on the figures submitted as part of  
193 the Application. The Project Area border has been added around these parcels.

194

195 **Q. As a result of the parcel status updates you just discussed, please summarize**  
196 **the updates to the Project layout reflected in Badger Wind’s May 14, 2024 filing.**

197 A. As a result of the updates to the Project Area described above, the Project layout has  
198 been revised as follows:

- 199 • One turbine location (T97) has been removed, along with associated facilities  
200 (roads, collection, crane paths).
- 201 • Turbine T96B has been shifted to a new position (T96C) to comply with the setback  
202 from a now nonparticipating parcel, and associated facilities (roads, collection,  
203 crane paths) have been adjusted accordingly. Turbine T96C is located in  
204 cultivated land.
- 205 • Collection lines have been rerouted to avoid Parcels 1b and 1c.

206  
207 Additionally, Badger Wind adjusted the location of the access road to permanent met  
208 tower (MET 1) to avoid impacting a wetland.

209

210 **Q. Have the adjustments described above been made to the sound and shadow**  
211 **flicker modeling?**

212 A. Yes. The same changes have been made in the updated Sound Analysis Report  
213 (proposed **BW Exhibit 5**), updated Shadow Flicker Analysis Report (proposed  
214 **BW Exhibit 6**), and updated Receptor Table (proposed **BW Exhibit 7**).

215

216 **Q. Is the layout shown on updated Application Figures 1-13 (proposed**  
217 **BW Exhibit 3**), which were filed on May 14, 2024, the final layout?

218 A. Yes.

219

220 **Q. Since the Application was filed, have any additional or updated reports been**  
221 **completed?**

222 A. Yes. Since the Application was filed, Badger Wind completed or updated the  
223 following:

- 224 • Updated Sound Analysis Report (proposed **BW Exhibit 5**) (filed May 14, 2024)
- 225 • Updated Shadow Flicker Analysis Report (proposed **BW Exhibit 6**) (filed May 14,  
226 2024)
- 227 • Updated Sound Analysis Tech Memo (Sound Barriers) (proposed **BW Exhibit 12**)

228

229 The wildlife and natural resource studies and reports are discussed in the Direct  
230 Testimony of Andrew Krieger.

231

#### 232 **IV. DESCRIPTION OF THE PROJECT**

233

234 **Q. Please provide an overview of the current Project.**

235 A. The Project is now located within an approximately 34,897 acre Project Area in Logan  
236 and McIntosh Counties, North Dakota (see updated Figure 1, proposed  
237 **BW Exhibit 3**). The Project will have a nameplate capacity of up to 262.26 MW, with  
238 up to 250 MW delivered to the grid. The Project facilities will include:

- 239 • 102 wind turbine locations, of which up to 93 wind turbines will be constructed;

- 240 • buried electrical collection lines and communication lines with aboveground
- 241 junction boxes and/or underground splices;
- 242 • new gravel access roads and improvements to existing roads, as necessary;
- 243 • a collector substation;
- 244 • five proposed permanent meteorological evaluation tower (“MET”) positions, of
- 245 which up to three will be constructed;
- 246 • an aircraft detection lighting system (“ADLS”) and related equipment;
- 247 • an operations and maintenance (“O&M”) facility located in McIntosh County; and
- 248 • temporary facilities, including: a temporary batch plant, a laydown yard for
- 249 construction offices, a multi-purpose laydown area to support the Project’s
- 250 construction activities, a marshalling yard to assist with logistics during turbine
- 251 component deliveries, temporary crane paths, and temporary road improvements,
- 252 as needed.

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**Q. Is the Project’s interconnection the same?**

A. Yes. The Project will still interconnect to the grid via an approximately 0.25-mile transmission line extending from the Project substation to the Wishek Junction 230-kilovolt substation owned and operated by Montana-Dakota Utilities (“MDU”).

**Q. Does Badger Wind have an executed Generator Interconnection Agreement (“GIA”) for the Project?**

A. Yes. Badger Wind has a fully executed GIA with the Midcontinent Independent System Operator’s (“MISO”) and MDU, the interconnecting utility for the Project.

**Q. Has the Project identified an off-taker for the Project?**

A. Badger Wind has signed term sheets with three separate off-takers that, in total, cover the full capacity of the Project’s output, and is currently negotiating the associated Power Purchase Agreements.

269 **Q. What is the anticipated schedule for the construction and in-service of the**  
270 **Project?**

271 A. Project construction is anticipated to begin as early as Q3 2024 and be completed by  
272 the end of 2025. Badger Wind anticipates full commercial operation by the end of  
273 2025.

274

275 **Q. What is the estimated total cost of the Project?**

276 A. The estimated total cost to construct the Project is approximately \$472 million.

277

278 **Q. Has Badger Wind obtained the necessary property rights to construct the**  
279 **Project within the proposed Project site?**

280 A. Yes. All participating landowner agreements have been secured.

281

## 282 **V. PROPOSED PROJECT LAYOUT**

283

284 **Q. Discuss the changes made to the Project layout since the 2022 Order and CSC**  
285 **were issued.**

286 A. As discussed above, Badger Wind is now proposing 102 potential turbine locations,  
287 of which up to 93 turbines will be constructed. Of the original 79 turbine locations  
288 approved by the PSC in 2022, eight have been removed from the layout and nine  
289 have been adjusted to accommodate the new, smaller turbine dimensions.  
290 Associated facilities (roads, collection, crane paths) have been adjusted accordingly.  
291 A figure showing the changes to the Project layout from the layout approved by the  
292 2022 PSC Order and CSC is included as Figure 3 in proposed **BW Exhibit 3**. As  
293 noted above, the final layout for the Project was filed with the PSC on May 14, 2024  
294 and is shown in the figures in proposed **BW Exhibit 3**.

295

296 **Q. Will Badger Wind still construct up to three permanent meteorological towers?**

297 A. Yes. Badger Wind will construct up to three of the five potential permanent  
298 meteorological tower locations.

299

300 **Q. Are the locations of the Project substation, O&M facility, and laydown areas the**  
301 **same as were approved by the PSC in 2022?**

302 A. Yes.

303

304 **Q. Did Badger Wind specifically take into consideration landowner input in the**  
305 **updated Project design?**

306 A. Yes. Badger Wind conducted site plan reviews with individual landowners to review  
307 the updated preliminary layout and receive feedback before finalizing the layout.  
308 Comments and suggestions made by participating landowners were considered and  
309 incorporated into the final layout, when possible.

310

311 **Q. Will Badger Wind limit the total number of turbines constructed within the**  
312 **Project Area to up to 93 turbines?**

313 A. Yes. Although a total of 102 potential turbine locations are proposed, only up to 93  
314 turbines will be constructed.

315

316 **VI. SETBACKS**

317

318 **Q. Does the Project continue to comply with all the setback requirements in the**  
319 **Siting Act and the PSC's rules?**

320 A. Yes. The Project continues to comply with all setbacks outline in Table 3-5 in the  
321 Application (proposed **BW Exhibit 1**).

322

323 **Q. Does the Project continue to comply with all applicable local setback**  
324 **requirements?**

325 A. Yes. The Project continues to comply with all applicable Logan County requirements.  
326 McIntosh County has not enacted zoning and, therefore, does not have setback  
327 requirements for wind energy projects. Where local setback requirements differ from  
328 requirements of the PSC, the Project will adhere to the more stringent requirements.

329

330 **Q. In calculating your setback distances, did you measure from the closest edge**  
331 **of the base of the turbine to the closest edge of the applicable feature or**  
332 **specified right-of-way?**

333 A. Yes.

334

335 **Q. Has Badger Wind prepared a figure that depicts setbacks and other siting**  
336 **constraints for the Project?**

337 A. Yes, that information is depicted in the Project Setbacks map provided as updated  
338 Figure 6 (proposed **BW Exhibit 3**).

339

340 **Q. Does the Project Setbacks map (proposed BW Exhibit 3) show participating and**  
341 **nonparticipating residences?**

342 A. Yes. The light pink squares are nonparticipating occupied residences, and the purple  
343 squares are participating occupied residences.

344

345 **Q. Has Badger Wind also prepared an updated table summarizing information**  
346 **pertaining to receptors in and around the updated Project Area?**

347 A. Yes, an updated Project Receptor Table is provided as proposed **BW Exhibit 7**. This  
348 is an updated version of the table that was filed with the Application. The table lists  
349 the participant status of the structure, the type of structure, the nearest turbine to each  
350 structure, the distance in feet from the nearest turbine to the structure, the modeled  
351 sound power level in A-weighted decibels (“dBA”), the modeled shadow flicker in  
352 hours per year, and whether a sound waiver is required/obtained.

353

354 **Q. Please describe how Badger Wind updated the list of identified inhabited**  
355 **residences for the current Project.**

356 A. Badger Wind started with the list of inhabited residences developed as part of the  
357 2022 CSC Application<sup>1</sup> and reviewed that list to determine whether any updates were  
358 necessary. In 2023, Badger Wind’s consultant DNV Energy USA Inc. (“DNV”)  
359 conducted a desktop review of aerial imagery (e.g., National Agriculture Imagery  
360 Program data) for the updated Project to identify any additional structures that had not  
361 been identified in 2022. Three additional structures were identified as being possible  
362 residences. Badger Wind then conducted field verification of the three additional  
363 structures. After visual inspection and contacting the owners of the structures, we  
364 determined that the three additional structures were not inhabited residences.  
365 Accordingly, no new inhabited residences or community buildings were identified. As  
366 a result of the analysis, 48 inhabited residences and six community buildings were  
367 identified as receptors.

368

369 **Q. Please discuss the receptors included in the sound and shadow flicker**  
370 **modeling.**

371 A. The sound modeling included receptors within one mile of turbines, which included  
372 the 48 inhabited residences and six community buildings referenced above. The  
373 shadow flicker analysis included occupied residences within 5,003 feet of a Project  
374 turbine, which included 45 of the 48 inhabited residences referenced above. This  
375 information is provided in the updated Receptor Table (proposed **BW Exhibit 7**).

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<sup>1</sup> Case No. PU-22-86, Docket Item No. 55, BW Exhibit 30 at 13-14 (Pre-filed Direct Testimony of Nicholas Gebauer); Case No. PU-22-86, Docket Item No. 103, BW Exhibit 26 (Preliminary Building Inventory Figure).

377 **Q. Receptor 220 is included in the updated Receptor Table (proposed**  
378 **BW Exhibit 7) but is not included in the sound or shadow flicker modeling. Why**  
379 **was that occupied residence included?**

380 A. That inhabited residence was included in the updated Receptor Table to highlight that  
381 its status was updated from participating to nonparticipating.

382

383 **VII. UPDATED SOUND ANALYSIS REPORT**

384

385 **Q. Please discuss the updated sound modeling analysis conducted for the Project.**

386 A. Badger Wind retained DNV to conduct an updated sound modeling analysis to  
387 determine if the Project would comply with the applicable PSC requirement. DNV  
388 conducted a sound modeling analysis for the updated Project, and the associated  
389 report was submitted as Appendix E to the Application (proposed **BW Exhibit 1**). The  
390 sound modeling analysis was further updated to include the updates to the Project  
391 Area and layout described in Badger Wind's May 14, 2024 filing; the updated report  
392 was submitted as proposed **BW Exhibit 5**. The methodology used, including  
393 conservative assumptions, and the modeling results are detailed in the report (see  
394 proposed **BW Exhibit 5**).

395

396 **Q. Please explain why 101 turbine locations were modeled even though the Project**  
397 **includes 102 potential turbine locations.**

398 A. There is one pair of turbine positions (T73 and T73B) that are designed such that only  
399 one of these two positions can be constructed due to their proximity and mutual  
400 waking. Therefore, the sound analysis only modeled turbine 73 because it has higher  
401 sound power levels at the receptors and thus represents the most conservative and  
402 realistic sound modeling scenario. Accordingly, 101 turbine locations were modeled.  
403 Only up to 93 turbine locations would be constructed.

404

405 **Q. Based on the results of the updated sound modeling analysis, nine residences**  
406 **(six participants and three nonparticipants) are shown as having estimated**

407 **sound levels above 45 dBA. Has Badger Wind obtained waivers from the**  
408 **owners of those nine residences?**

409 A. The owners of six of these inhabited residences are participants in the Project and  
410 have signed wind energy lease agreements and easements that waive the sound  
411 requirement (see Appendix J to the Application, proposed **BW Exhibit 1**). Badger  
412 Wind obtained a waiver from the owner of one inhabited residence (a nonparticipant),  
413 which is included in Appendix J to the Application (proposed **BW Exhibit 1**). Badger  
414 Wind is in the process of securing a waiver from the owners of the remaining two  
415 inhabited residences (both residences are owned by the same owners). While the  
416 residences are on a nonparticipating parcel of land, the owners of the residences own  
417 other land that is leased by Badger Wind and part of the Project.

418

419 For all other inhabited residences and community buildings, the modeled sound level  
420 within 100 feet of the receptor is at or below 45 dBA.

421

422 **Q. If Badger Wind does not obtain a waiver for the remaining two receptors, what**  
423 **will Badger Wind do to ensure that the Project complies with the applicable**  
424 **sound limit?**

425 A. The cause of the sound level exceedance at these receptors is the transformers at the  
426 Project substation. If Badger Wind is unable to obtain a waiver, Badger Wind will  
427 construct 15-foot-tall, two-sided sound barriers on the sides of the two substation  
428 transformers. The sound barriers will minimize sound emissions from the  
429 transformers and ensure the Project is in compliance with the PSC's sound  
430 requirement.

431

432 **Q. Did Badger Wind conduct updated sound modeling with the sound barriers**  
433 **included to confirm the Project will comply with the PSC's sound requirement?**

434 A. Yes. A tech memo describing the results of that analysis is provided as proposed  
435 **BW Exhibit 12**. As shown in the updated analysis with the sound barriers included,  
436 the modeled sound levels at these two receptors are in compliance with the PSC's  
437 sound requirement.

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**Q. Prior to construction, will Badger Wind either file the requisite sound waiver or include the sound barrier in the Project’s pre-construction engineering design submittal to confirm compliance with the PSC’s sound avoidance area requirement?**

A. Yes.

**VIII.SHADOW FLICKER REPORT**

**Q. Please discuss the updated shadow flicker analysis conducted for the Project.**

A. Badger Wind retained DNV to conduct an updated shadow flicker analysis for the updated Project design, and the associated report was submitted as Appendix F to the Application (proposed **BW Exhibit 1**). The shadow flicker analysis was further updated to include the updates to the Project Area and layout described in Badger Wind’s May 14, 2024 filing; the updated report was submitted as proposed **BW Exhibit 6**. The methodology used, including the conservative assumptions, and the assessment results are detailed in the report (see proposed **BW Exhibit 6**).

**Q. Are any residences estimated to experience more than 30 hours of shadow flicker per year?**

A. No. Based on the updated shadow flicker analysis conducted, no inhabited residence is expected to experience more than 30 hours per year of shadow flicker (see proposed **BW Exhibit 6**).

**IX. EXISTING INFRASTRUCTURE**

**Q. Please discuss the updated microwave beam path study for the current Project.**

A. Badger Wind updated its microwave beam path study and concluded that the current Project will not impact that resource. A copy of the study is included in Appendix C to the Application (proposed **BW Exhibit 1**).

469 **Q. Does the Project continue to avoid all microwave beam paths?**

470 A. Yes. One microwave beam path has been identified overlapping the Project Area.  
471 Turbines 19 and 37 are the closest turbines to the beam path and have been  
472 positioned at the recommended setback distance to the Fresnel zones associated with  
473 the beam path. No adverse impact is expected.

474

475 **Q. Please discuss the updated telecommunications study conducted for the**  
476 **current Project.**

477 A. Badger Wind updated its telecommunications study to identify communication towers  
478 and antennas licensed by the Federal Communications Commission in the vicinity of  
479 the Project. A copy of the study is included in Appendix C to the Application (proposed  
480 **BW Exhibit 1**).

481

482 **Q. Does the Project continue to avoid interference with communication towers and**  
483 **antennas?**

484 A. Yes.

485

486 **Q. Is it still anticipated that the Project will not impact TV reception?**

487 A. Yes. The Off-air TV Analysis<sup>2</sup> performed for the 2022 CSC Application remains  
488 accurate for the current Project. Additionally, the TV Signal Baseline Measurements  
489 Report<sup>3</sup> remains accurate for the current Project. TV reception at residences relying  
490 on cable or satellite TV service will not be impacted by construction or operation of the  
491 Project. If residents who rely on antennas experience signal disruption, Badger Wind  
492 will coordinate with the resident to mitigate the disruption. Impacts to low-power  
493 stations and translator stations are not anticipated to occur because those stations  
494 have a limited range.

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<sup>2</sup> Case No. PU-22-86, Docket Item No. 1, BW Exhibit 1 at Appendix C (Application Appendix C, Telecommunications Studies).

<sup>3</sup> Case No. PU-22-86, Docket Item No. 94, BW Exhibit 17 (TV Signal Baseline Measurements Report).

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**Q. Does the Project continue to avoid impacts to existing infrastructure?**

A. Yes. In addition to applying required setbacks from specified structures, Badger Wind has designed the Project to avoid impacts to other existing infrastructure, including domestic, stock, industrial, and observational water wells and oil and gas wells and storage tanks. For example, Badger Wind has voluntarily sited turbines 168 meters (approximately 551 feet) (turbine tip height) away from inactive oil and gas wells in the Project Area; no active oil and gas wells were identified within the Project Area. Prior to and during construction, Badger Wind will continue to coordinate with existing infrastructure owners to ensure compatibility between the Project and existing infrastructure.

**Q. Will the Project participate in the North Dakota One-Call program, both prior to construction and as a facility owner once the Project is constructed?**

A. Yes.

**X. LIGHT-MITIGATION TECHNOLOGY**

**Q. Does Badger Wind continue to commit to utilizing a light-mitigating technology that is consistent with applicable requirements, subject to Federal Aviation Administration (“FAA”) approval?**

A. Yes. Badger Wind will use commercially reasonable efforts to install a light-mitigating technology that is consistent with applicable requirements. Currently, Badger Wind plans to utilize ADLS, subject to FAA approval. Lighting of ancillary structures will be downward shielded.

**Q. With respect to the light-mitigating technology to be used for the Project, has FAA approval been obtained?**

A. Badger Wind has not yet filed for ADLS FAA approval because Badger Wind has not yet selected the turbine(s), which is an important element to the ADLS. Badger Wind

525 will seek the necessary FAA approval once the final turbine model(s) has been  
526 selected.

527

528 **XI. EMERGENCY RESPONSE**

529

530 **Q. What steps will the Project take to prepare for a potential emergency situation**  
531 **at the Project site?**

532 A. Badger Wind will coordinate with emergency service providers to determine  
533 appropriate safety precautions/standards and has developed an Emergency  
534 Response Plan, attached to the Application as Appendix P (proposed **BW Exhibit 1**).

535

536 **XII. DECOMMISSIONING AND RESTORATION OF PROJECT AREA**

537

538 **Q. Does Badger Wind continue to commit to complying with applicable**  
539 **decommissioning and restoration requirements?**

540 A. Yes. Badger Wind will file a decommissioning plan for review by the PSC prior to the  
541 commencement of operations and comply with the applicable financial assurance  
542 provisions. When the Project is decommissioned, Badger Wind will restore the site in  
543 accordance with the PSC's and Logan County's decommissioning requirements.

544

545 **XIII. PROJECT BENEFITS**

546

547 **Q. In addition to providing payments to additional landowners due to the increased**  
548 **Project Area, how have the Project's anticipated benefits changed as a result of**  
549 **the updates?**

550 A. Over the 30-year life of the Project, Badger Wind would pay approximately \$37.9  
551 million to state and local taxing authorities (including approximately \$12.6 million to  
552 the State of North Dakota, approximately \$7.8 million to Logan County, approximately  
553 \$6.7 million to McIntosh County, and approximately \$9.5 million to Wishek #19 School  
554 District). This is an increase of over \$2 million in tax payments.

555

556 **XIV. PERMITS AND APPROVALS**

557

558 **Q. Are the potential permits and approvals required for the Project identified in**  
559 **Table 7-1 of the Application (proposed BW Exhibit 1)?**

560 A. Yes.

561

562 **Q. Has Badger Wind provided updates to Logan and McIntosh Counties regarding**  
563 **the updated Project?**

564 A. Yes.

565

566 **Q. Has Badger Wind obtained zoning approval from Logan County for the current**  
567 **Project?**

568 A. Yes. Badger Wind received a Wind Energy Facility Siting Permit/Conditional Use  
569 Permit for the current Project from Logan County on February 23, 2024. This was  
570 filed with the PSC on March 5, 2024 and is provided as proposed BW Exhibit 4.

571

572 **Q. Does the Project need to obtain zoning permits from McIntosh County?**

573 A. No. McIntosh County has not enacted a zoning ordinance, and confirmed on  
574 August 29, 2023 that the Project will not require any zoning permits/approvals from  
575 McIntosh County.

576

577 **XV. CERTIFICATION RELATING TO ORDER PROVISIONS FOR WIND ENERGY**  
578 **CONVERSION FACILITY SITING**

579

580 **Q. Has Badger Wind provided a signed Certification Relating to Order Provisions**  
581 **for Wind Energy Conversion Facility Siting, with accompanying Tree and Shrub**  
582 **Mitigation Specifications?**

583 A. Yes. Proposed BW Exhibit vp15 is the Certification, signed by Melissa Peterson on  
584 behalf of Badger Wind. Ms. Peterson has the authority to bind Badger Wind with  
585 respect to adhering to the Certification.

586

587 **Q. With respect to tree and shrub clearing, is Badger Wind still requesting the**  
588 **ability to clear an area wider than 50 feet in some locations within the Project**  
589 **Area?**

590 A. Yes. There are still some locations in the Project Area where we may need to remove  
591 trees and/or shrubs in areas wider than 50 feet. There are certain areas in the Project  
592 Area where we will need to clear areas up to 100 feet wide in order to co-locate  
593 collections lines, access roads, and/or crane walks. For this reason, Badger Wind is  
594 requesting that the PSC again grant approval to clear an area more than 50 feet wide  
595 for these portions of the Project Area.

596

597 **XVI. CONCLUSION**

598

599 **Q. Does the Project continue to meet all the requirements of the 2022 Order and**  
600 **CSC?**

601 A. Yes.

602

603 **Q. Does this conclude your Testimony?**

604 A. Yes.